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UNITED STATES DEPARTMENT OF AGRICULTURE
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FUEL CONSUMED AND WORK PERFORMED BY FARM TRACTORS

By
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Washington, D. C.
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SOURCE OF MATERIAL

Crop correspondents of the Agricultural Marketing Service in February 1941 supplied information on the fuel consumed, the average acreage plowed in a 10-hour day, and the total time tractors were used on their farms in 1940. They supplied information relative to the year of manufacture, type, size, and rubber-tire equipment of their tractors.

They also estimated the percentage distribution of tractors by types on farms in their locality, the extent of the use of rubber tires on general-purpose and standard-wheel tractors, the percentage of farmers owning combines, grain binders, mowers, and manure spreaders, and the proportion of these machines that were equipped with rubber tires. Usable reports were received from more than 25,000 crop correspondents who reported on machines for their localities and who also made reports on more than 17,000 tractors on their own farms. The reports provided complete information as to age and type of tractor and extent of use of rubber tires for more than 13,000 tractors. Complete information as to tractor type, age, size, and rubber-tire equipment, fuel consumed, average acreage plowed in 10 hours, width of cut plowed, and total time used in 1940 was obtained for more than 5,300 tractors.

This report summarizes chiefly the findings of the study concerning fuel consumed, acreage plowed, width of plows used, and total time of tractor use in 1940.

Other findings of the study are summarized in the reports, "Rubber Tire Equipment of Principal Farm Machines," and "Farm Tractors, Type, Size, Age and Life." The material was analyzed in the Bureau of Agricultural Economics. David O. Thomas, L. G. Shestock, Caroline G. Towles, Edith E. Snow, Cora L. Whitmer, Dorothy R. Owen, and other members of the staff assisted in the computations.

Data collected in cooperation with the Agricultural Statistics Division, which was transferred from the Agricultural Marketing Service to the Bureau of Agricultural Economics, by Executive Order No. 9069 of February 23, 1942.

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PRELIMINARY

During the crop season of 1942 there will be more motive-power machines on farms in the United States than in any previous crop season. With full and proper use these machines will be of great value in producing and marketing our increased agricultural supplies. In round numbers, on January 1, 1942, they came to a total of 7.0 million units, composed of the following: Farm tractors, 1.8 millions, farm automobiles, 4.2 millions, and farm motortrucks, 1.05 millions.

At the beginning of World War I there were only a few power machines on the farms of the United States. Practically all of the power used for field work, and for farm transportation, was supplied by about 26 million head of horses and mules. The place of these work animals has been taken to a considerable extent by the power machines.

The adoption of mobile machine power on farms and in urban areas has brought important changes in the farm picture. Before World War I almost 100 million acres of our harvested cropland was used for producing feed for horses and mules on farms and in cities. Today with but few work animals in cities and towns, and the number of these animals on farms greatly reduced, slightly less than 50 million acres of cropland are now used for producing feed for horses and mules.

The adoption of machine power has increased the size of power units on many farms, and the rate of travel for performing many farm operations has increased substantially. At the same time new machines and new methods have been adopted. With larger and faster units of power, accompanied by the use of larger tillage and harvesting machines, production per worker of products for sale and for use in the farm home is now about 50 percent greater than in the period 1910-14. Not only are farm workers doing more work per day, but they are also producing products for sale on 35 million acres of cropland that was used formerly for producing feed for farm horses and mules.

This cropland has in the past years contributed substantially to the surplus problem in agriculture. But these surplus acres are now needed for supplying the war needs of the United Nations, and these acres, along with our labor-saving machines and a fuller utilization of our work animals, will make possible the efficient production of large food supplies. The need for keeping these machines in repair, the animals in good working condition, and of supplying workers for their full use must not be underestimated.

TRACTORS NOW CONSUME ABOUT ONE-HALF OF FARM MOTOR FUEL

The rapid adoption of power machines on farms has been accompanied by a marked expansion in the use of motor fuel. Before World War I the annual consumption of motor fuel by farmers of the United States slightly exceeded 100 million gallons. In 1940 farmers consumed thirty times this quantity (table 1).

With tractor numbers on farms on January 1, 1942 at about 1,800,000, compared with 1,545,000 on January 1, 1940, and with numbers of farm automobiles and motortrucks at their height so far, consumption of motor fuel in 1942 would have surpassed considerably the 1940 figure had there been no restriction in the use of rubber. This restriction will undoubtedly cause a curtailment in the use of motor fuel on farms, especially in automobiles driven for personal use.

In the period 1910-14 the tractor was the principal user of motor fuel on farms, with stationary farm engines of second importance. In 1940 almost half of the farm-used motor fuel was consumed by automobiles, and 42 percent was consumed by tractors. Consumption by stationary engines on farms has increased little in the last 30 years.

During the last decade farm tractors have been taking an increasing proportion of the motor fuel consumed on farms, and with tractor numbers increasing, and with restrictions in rubber use likely to reduce annual use of farm automobiles and farm motortrucks more than farm tractors, consumption of motor fuel by tractors may soon be as great, or even greater, than consumption by all other farm motors.

Table 1. - Motor fuel consumed on farms, yearly average for designated periods and for 1940 1/

Period or year	Motor fuel consumed by			Total fuel consumed 2/
	Farm automobiles	Farm motortrucks	Farm tractors	
	Million gallons	Million gallons	Million gallons	Million gallons
1910-14	26	1	42	110
1920-24	611	82	330	1,084
1930-34	1,242	324	742	2,375
1940	1,558	341	1,390	3,357

1/ Before 1940, data were compiled largely from BAE report "Income Parity for Agriculture, Part II, Section 4, Oct. 1940." Data for tractors in 1940, were computed by applying crop correspondent's estimates of average fuel consumption to the estimated average number of tractors on farms in 1940. Fuel consumption in 1940 for automobiles and motortrucks was based on estimated numbers of these machines as shown by the 1940 Census and on average fuel consumption of automobiles and trucks.

2/ Includes motor fuel consumed by stationary engines on farms.

GASOLINE THE PRINCIPAL TRACTOR FUEL

Gasoline was the leading motor fuel consumed by the first farm tractors, but in 1920 and in 1930 consumption of all other motor fuels was greater than the consumption of gasoline. In 1940, gasoline again was the principal tractor fuel, constituting more than two-thirds of all fuel consumed by tractors. Only about 6 percent of the total tractor fuel in 1940 was kerosene. Diesel oil, fuel oil, butane, and other motor fuels combined made up about one-fourth of the total (table 2).

Gasoline was the leading tractor fuel in all regions, except in the South Central States where farmers usually do not receive rebates on taxes paid on gasoline used by farm tractors. In the Pacific Coast and Mountain States, where track-laying tractors are important, the consumption of other tractor fuel, especially Diesel oil, was above the country's average (table 3). Consumption of other motor fuel was also important in the South Central States.

Table 2. - Fuel consumed by farm tractors in the United States for designated years 1/

Year	Average number of farm tractors 2/	Annual use per tractor	Fuel consumed per tractor			Fuel consumed per hour of tractor use
			Gasoline	All other fuel	Total fuel	
	Thousands	Hours	Gallons	Gallons	Gallons	Gallons
1910	3	680	1,870	1,530	3,400	5.0
1920	295	400	368	552	920	2.3
1930	959	390	328	452	780	2.0
1940	1,600	493	600	269	869	1.76
1941 3/	1,732	493	600	269	869	1.76

1/ See footnote 1, table 1.
2/ Average of numbers at beginning and end of year.
3/ Preliminary estimates.

EARLY TRACTORS CONSUMED MORE FUEL

In the early years of use on farms (about 1910), tractors were few in number, on the average larger in terms of D.B.H.P., and much heavier than they now are. In general, they were used more hours per year, and their use was confined more to doing the heavier jobs than is the case today.

The result was more fuel consumed per tractor on both a yearly and an hourly basis. Thus, in 1910 the average annual consumption of fuel was 3,400 gallons and the consumption per hour of use was 5.0 gallons, compared with only 869 gallons per year and 1.76 gallons per hour in 1941, (table 2).

The decrease in annual days of use in fuel consumption was quite pronounced by 1920. Later with increased use of the general-purpose tractor, rubber tires, and machines and implements suited for more jobs, the annual days of use per tractor increased again. Now, each tractor on farms is used an average of about 490 hours compared with about 390 hours in 1930. During the same period, however, fuel consumption per tractor increased at a slower rate, and consumption per hour of tractor use actually declined further, or from about 2 gallons to 1.76 gallons.

Table 3. - Average fuel consumption and annual use, per tractor, by State groups, 1940

State group	Tractors on farms Jan. 1, 1941 1/	Average size of tractor 2/	Fuel consumed per tractor in 1940: Gasoline	Kerosene	Other fuel	Total	Average tractor use in 1940	Fuel consumed per hour of tractor use in 1940
	Thousands	D.B.H.P.	Gallons	Gallons	Gallons	Gallons	Hours	Gallons
North Atlantic 3/	165	13.4	428	92	58	578	395	1.46
Corn Belt 4/	492	15.5	565	38	151	754	456	1.65
Lake States 5/	268	15.0	483	21	186	690	422	1.64
Great Plains 6/	276	17.6	734	47	385	1,166	585	1.99
South Atlantic 7/	67	13.6	353	104	152	609	372	1.64
South Central 8/	68	15.2	58	280	485	823	470	1.75
Oklahoma-Texas	153	16.6	959	128	82	1,169	653	1.79
Mountain 9/	80	18.1	605	20	400	1,025	530	1.93
Pacific 10/	96	19.8	682	12	502	1,196	586	2.04
United States	1,665	15.9	600	52	217	869	493	1.76

1/ Tractor numbers estimated from reports of the Bureau of the Census, 1940, and from reports of the Department of Commerce which show tractor sales in 1940.

2/ D.B.H.P. ratings are for general-purpose, standard-wheel, and track-laying tractors, which together account for about 98 percent of all tractors on the farms included in the study. D.B.H.P. ratings are based on tests of the Nebraska Experiment Station, and on manufacturers' ratings. Some tractors originally with steel traction are now equipped with rubber tires. The use of rubber tires increases the D.B.H.P. ratings of tractors somewhat, but no effort was made in the above calculation to take this into consideration.

3/ Includes the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania.

4/ Includes the States of Ohio, Indiana, Illinois, Iowa, and Missouri.

5/ Includes the States of Michigan, Wisconsin, and Minnesota.

6/ Includes the States of North Dakota, South Dakota, Nebraska, and Kansas.

7/ Includes the States of Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida.

8/ Includes the States of Kentucky, Tennessee, Alabama, Mississippi, Arkansas, and Louisiana.

9/ Includes the States of Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada.

10/ Includes the States of Washington, Oregon, and California.

FUEL CONSUMPTION CLOSELY RELATED TO DAYS OF USE

Rather wide variations in annual fuel consumption of tractors are found in the different State groups, and these differences reflect mainly differences in annual usage and tractor size (table 3).

Annual fuel consumption is high in the Pacific Coast States, Oklahoma and Texas, the Great Plains, and the Mountain States. In the State groups with high fuel consumption per tractor, both annual hours of tractor use and fuel consumed per hour of tractor use are higher than the average for the United States. In the Eastern and Southern States where annual hours of use and fuel consumed per hour of use are low, the quantity of fuel used per tractor year is substantially below the Nation's average.

FUEL CONSUMPTION CLOSELY RELATED TO SIZE AND AGE OF TRACTOR

The crop correspondents supplied estimates as to the total time their tractors were used and the total fuel consumed in 1940. Heavy jobs, like plowing, would require more than average quantity of fuel per hour of tractor use, and light jobs, such as cultivating and seeding, would use less per hour than the average computed for all work.

For the various types of tractors total fuel consumption per day of use increases with the drawbar horsepower rating of the tractor. But the fuel consumed per rated drawbar horsepower is much higher for the small tractors than for the large ones (table 4).

This statement applies to each type of tractor and to each of the various age groups. It seems likely in this connection that the large tractors are operated with less than capacity loads to a greater extent than are the small tractors. Farmers often buy tractors with sufficient power for performing a specific job. For other farm operations the available implements and machines are often small in relation to the tractor power. Also, many farm jobs are light-duty jobs and even the small tractors have more power than is needed for performing the work. Thus, tractors, especially the larger ones, are often operated considerably below their capacity.

The newer general-purpose and standard-wheel tractors of about the same size consume less fuel per hour of use than do the older tractors. This is caused largely by the fact that a much higher percentage of the new wheel tractors of both types have rubber tires. Tests made by some State Agricultural Experiment Stations show that with rubber tires, tractors develop more drawbar power than do the same tractors mounted on steel wheels, and consequently the newer tractors have higher D.B.H.P. ratings than do similar tractors with steel wheels. In general, it can be said, therefore, that rubber tires on wheel tractors tend to increase the amount of work performed per day and per gallon of fuel consumed. For track-laying tractors of the same size group, fuel consumption does not vary greatly with the tractor age.

Of the tractors now on farms, the newer tractors of each type are considerably larger in terms of D.B.H.P. rating than are the older tractors. But the older tractors, although they have less horsepower, usually consume nearly as much fuel per day of use as do the new tractors of the same type. The older tractors consume considerably more fuel per rated D.B.H.P. than is consumed by the newer tractors (table 5).

Table 4. - Fuel consumed by tractors of different size, classified by type, 1940

Tractor-size group 1/	Average tractor size	Fuel consumed in 10-hour day: Per tractor	Fuel consumed in 10-hour day: Per rated D.B.H.P.
D.B.H.P.	D.B.H.P.	Gallons	Gallons
General-Purpose			
Less than 12	10.3	12.8	1.24
12 to 18.4	15.8	16.0	1.01
18.5 to 24.9	20.4	18.4	.90
25 and over	26.6	20.9	.79
Standard-Wheel			
Less than 12	10.8	16.6	1.54
12 to 18.4	15.7	20.8	1.32
18.5 to 24.9	22.4	24.5	1.09
25 and over	28.3	30.0	1.06
Track-Laying			
Less than 12	10.3	15.8	1.53
12 to 18.4	16.2	21.0	1.30
18.5 to 24.9	20.4	24.5	1.20
25 and over	32.6	27.5	.84

1/ See footnote 2, table 3.

See tables 16 and 17 for more detailed information.

Table 5.- Fuel consumed by tractors of different ages, classified by types, 1940

Age of tractor Jan. 1, 1941	Average tractor size 1/	Fuel consumed in 10-hour day	
		Per tractor	Per rated D.B.H.P.
	D.B.H.P.	Gallons	Gallons
General-Purpose			
Less than 5 years	15.5	15.6	1.01
5 - 9 years	14.8	15.8	1.07
10 - 14 years	13.6	16.6	1.22
All ages 2/	15.2	15.8	1.04
Standard-Wheel			
Less than 5 years	18.9	21.0	1.11
5 - 9 years	16.7	21.0	1.26
10 - 14 years	15.2	20.4	1.34
15 years and over	12.6	18.2	1.44
All ages	15.9	20.6	1.30
Track-Laying			
Less than 5 years	25.1	25.0	1.00
5 - 9 years	23.5	24.8	1.06
10 - 14 years	22.4	25.1	1.12
All ages 2/	24.2	24.9	1.03

1/ See footnote 2, table 3.

2/ Includes some tractors 15 years or more of age.

See tables 16 and 17 for more detailed information.

LARGER TRACTORS USED MORE DAYS PER YEAR

Size of tractor, age, and extent and types of service performed influence the use made of tractors in any given year. Large general-purpose tractors (25 or more rated D.B.H.P.) work a third more days per year than do those of less than 12 D.B.H.P. rating.

But the increase in days worked by the larger standard-wheel and track-laying tractors, compared with the smallest size, is very much greater, averaging about 135 percent for the former, and 175 percent for the latter type (table 6).

One reason for these differences in increased hours of use is that the small general-purpose tractors are used 67 percent more hours per year than the small standard-wheel tractors, and about 60 percent more than the small track-laying type, whereas the large standard-wheel tractors are used only about 3 percent more hours per year, and the track-laying tractors are used about 28 percent more than the large general-purpose tractors.

Table 6. - Average annual hours of use of farm tractors, by size and type of tractor, United States, 1940

Tractor size group 1/	General-purpose tractors	Standard-wheel tractors	Track-laying tractors
D.B.H.P.	Hours	Hours	Hours
Less than 12	487	291	307
12 - 18.4	562	439	515
18.5 - 24.9	607	496	591
25 and over	664	681	850

1/ See footnote 2, table 3.

See tables 16 and 17 for more detailed information.

From a regional standpoint, tractors of each type are used more per year in those regions where size of tractor is above average, such as the Great Plains, Oklahoma and Texas, and to a lesser extent, in the Pacific Coast and Rocky Mountain States (table 7). Even so, the variation in annual use for all types and in all regions is tremendous. Thus, for the country as a whole, over one-half of the general-purpose tractors are used between 200 and 600 hours a year, and about 14 percent are used more than 1,000 hours per year. Almost 27 percent of the standard-wheel type are used less than 200 hours a year, and only about 10 percent are used more than 1,000 hours. Track-laying tractors are fairly well distributed over the entire range of days worked, from less than 200 hours to 1,400 or more hours. More than 21 percent of this type were used 1,000 or more hours in 1940.

Table 7.- Distribution of tractors according to hours used in 1940, by type of tractor and group of States

State groups 1/	Tractors on farms Jan. 1, 1941	Percentage of tractors in 1940 that were used - Less than 200 hours	200 to 399 hours	400 to 599 hours	600 to 799 hours	800 to 999 hours	1,000 to 1,399 hours	1,400 and more hours
	Thousands	Percent	Percent	Percent	Percent	Percent	Percent	Percent
				General-Purpose				
North Atlantic	83	11.7	36.9	21.3	11.3	8.9	8.1	1.8
Corn Belt	344	9.8	29.9	28.4	14.7	5.8	9.1	2.3
Lake States	147	13.0	32.2	21.8	14.8	8.6	6.6	3.0
Great Plains	127	5.6	16.1	27.8	16.9	12.6	15.5	5.5
South Atlantic	33	13.9	38.2	25.2	9.6	1.8	7.8	3.5
South Central	44	17.5	34.2	15.8	14.9	3.6	9.6	4.4
Oklahoma and Texas	104	7.6	14.6	20.8	21.5	10.1	14.0	11.4
Mountain	31	8.9	27.2	27.1	19.6	8.9	7.0	1.3
Pacific Coast	19	10.5	26.3	27.6	13.2	6.6	6.6	9.2
United States	932	10.0	27.6	25.4	15.3	8.1	9.9	3.7
				Standard-Wheel				
North Atlantic	67	37.3	37.3	13.4	6.0	3.0	2.5	0.5
Corn Belt	139	35.3	32.8	17.3	6.2	3.2	3.8	1.4
Lake States	109	29.9	39.0	16.7	6.0	2.7	4.7	1.0
Great Plains	141	12.5	21.5	24.4	16.0	7.3	14.3	4.0
South Atlantic	29	37.5	32.6	13.5	9.6	2.0	4.8	-
South Central	23	37.8	22.0	10.9	11.0	1.2	13.4	3.7
Oklahoma and Texas	47	11.5	21.4	26.2	16.4	8.2	9.8	6.5
Mountain	38	21.7	25.3	19.3	15.1	5.4	11.4	1.8
Pacific Coast	29	31.6	33.7	11.9	16.3	4.3	1.1	1.1
United States	622	26.8	30.1	18.4	10.5	4.4	7.7	2.1
				Track-Laying				
Western 2/	56	9.2	22.6	17.6	14.6	12.6	12.3	11.1
All others 3/	27	22.0	27.2	12.7	17.0	4.2	12.7	4.2
United States	83	13.2	24.0	16.1	15.3	10.0	12.4	9.0

1/ See footnotes 3 to 10, table 3.

2/ Includes Mountain and Pacific Coast States.

3/ Includes all States except Mountain and Pacific Coast.

See table 17 for average hours used by age and type of tractor.

TRACTOR USE FALLS OFF WITH INCREASE IN AGE

Annual use of general-purpose tractors does not decrease appreciably as the age of the tractor increases, but annual use of the standard-wheel and track-laying tractors decreased markedly as the tractor age increased (table 8).

The small annual usage indicated for the older tractors of these last two types is probably due chiefly to the fact that these tractors are now owned by operators of relatively small farms, or that newer tractors, or teams, are contributing substantially to the total supply of farm power. It is likely also that the annual usage of old tractors now remaining on farms has been relatively small in recent years, perhaps frequently being used almost exclusively for belt work.

The old tractors are relatively abundant in areas where the farms are of fairly small size. Home-made tractors are found principally on small farms, and the acreage plowed, fuel consumed, and annual use is considerably below the average for all tractors (table 17).

For all tractors, exclusive of home-made and garden tractors, about 50 percent of those up to 15 years of age were used annually between 200 and 600 hours, but more than 50 percent of those that were 15 or more years of age were used less than 200 hours per year. As the age increased there was a definite tendency in the standard-wheel and track-laying groups for a greater proportion to work less than 200 hours per year, (table 9). In general there seems to be considerable opportunity for making greater use of many tractors now on farms, especially in case of the younger tractors that are used less than 400 hours per year.

Table 8. - Average annual usage by type and age of tractor, United States, 1940

Age of tractors Jan. 1, 1941	Average time used per tractor in 1940: General-purpose tractors	Standard-wheel tractors	Track-laying tractors	All tractors
	Hours	Hours	Hours	Hours
Less than 5 years	552	582	780	569
5 - 9 years	564	477	650	534
10 - 14 years	500	339	448	377
15 years and over	-	206	314	211
All ages	1/ 549	396	671	2/ 493

1/ Includes some general-purpose tractors 15 years of age and over.
2/ Includes home-made and garden tractors.

See tables 16 and 17 for more detailed information.

Table. 9.- Distribution of tractors according to hours used in 1940, by type and age of tractors, United States averages

Tractors Jan. 1, 1941		Percentage of tractors in 1940 that were used -						
Age	Number	Less than 200 hours	200 to 399 hours	400 to 599 hours	600 to 799 hours	800 to 999 hours	1,000 to 1,399 hours	1,400 and more hours
	Thousands	Percent	Percent	Percent	Percent	Percent	Percent	Percent
				General-Purpose				
Less than 5 years	700	10.1	27.7	25.2	15.3	7.8	9.9	4.0
5 to 9 years	147	7.7	28.2	23.6	16.2	9.6	12.3	2.4
10 to 14 years	80	14.0	25.8	30.5	13.2	8.5	5.1	2.9
All ages 1/	932	10.0	27.6	25.4	15.3	8.1	9.9	3.7
				Standard-Wheel				
Less than 5 years	138	10.3	21.5	24.1	15.3	8.8	14.4	5.6
5 to 9 years	108	15.5	29.3	23.3	14.6	4.7	10.4	2.2
10 to 14 years	282	27.7	33.3	18.8	9.2	3.7	6.0	1.3
15 years and over	94	57.8	31.7	4.0	4.8	.3	1.4	-
All ages	622	26.8	30.1	18.3	10.6	4.4	7.7	2.1
				Track-Laying				
Less than 5 years	48	4.5	20.8	15.8	17.2	12.7	17.2	11.8
5 to 9 years	17	9.5	23.8	25.4	15.9	11.1	8.0	6.3
10 to 14 years	13	32.4	32.3	8.8	13.2	4.4	3.0	5.9
15 years and over	5	44.5	29.6	14.8	3.7	-	7.4	-
All ages	83	13.2	24.1	16.1	15.3	10.0	12.4	8.9
				All Three Types 2/				
Less than 5 years	866	9.7	26.3	24.3	15.4	8.3	11.1	4.9
5 to 9 years	275	10.7	28.3	23.7	15.6	7.9	11.2	2.6
10 to 14 years	388	25.5	31.9	20.3	10.1	4.6	5.7	1.9
15 years and over	108	56.0	31.2	5.2	5.2	.3	2.1	-
All ages	1,637	16.5	28.2	22.1	13.5	6.9	9.3	3.5

1/ Includes some tractors 15 years of age and over.

2/ These three types (general-purpose, standard-wheel, and track-laying) make up more than 98 percent of all tractors on the reporting farms.

See table 17 for average hours used, by age and type of tractor.

RATE OF PLOWING DEPENDS LARGELY ON TRACTOR SIZE

In 1939, 55 percent of the breaking of land (plowing with moldboard and disk plows, listing, and bedding) was done with tractor plows. 1/ Tractor numbers have since increased substantially and numbers of work animals have decreased. Thus, it seems certain that the use of tractor power for plowing land in 1942 will be increased further.

The information that was supplied by crop correspondents on plowing pertains to the average acreage plowed in 10 hours and to the width of cut plowed with their tractor-drawn plows. No information was obtained as to the depth of plowing, prevailing soil type, topography, and size of field, all of which are important influences on the area plowed per tractor day. For light soils, for shallow plowing, for soils in good tilth and for level land, power requirements tend to be low and the area plowed per tractor day relatively high. On the other hand, heavy soils, deep plowing, soils in poor physical condition and hilly fields tend to average high in power required per acre, and relatively low in acres plowed per tractor day.

Size and shape of fields also affect the plowing rate. With large regular shaped fields, less time is consumed in turning and, consequently, more acres are usually plowed in a day than is the case for small and irregular shaped fields.

For the country as a whole the average width of plow cut was 31.3 inches and the average acreage plowed in 10 hours was 8.5 acres (table 10). These figures are averages for all tractors, including home-made, and garden tractors. For the principal tractor types, (general-purpose, standard-wheel, and track-laying) the average width of plow cut was 31.5 inches and the average acreage plowed in 10 hours was 8.6 acres.

For standard-wheel and track-laying tractors the area plowed per day increased about in proportion to the increase in tractor size. For these two types of tractors the area plowed per rated D.B.H.P. averaged from 0.54 to 0.62 acres for each of the different size groups.

Track-laying tractors on an average have considerably higher D.B.H.P. ratings than do the wheel tractors and the area plowed in 10 hours averaged about 60 percent higher than the average for all tractors. For general-purpose tractors, the area plowed was about 10 percent below the average of all tractors. The rate of plowing with plows drawn by home-made tractors was less than 50 percent of the average of all tractors.

For general-purpose tractors, the area plowed per rated D.B.H.P. decreased with increased tractor size. The large general-purpose tractors have D.B.H.P. ratings of about 150 percent more than the small tractors of this type, but the width of cut plowed was only about 50 percent greater for the larger tractors than for the smaller ones.

1/ Processed report, "Machine and Hand Methods in Crop Production," U.S.D.A., November 1940.

Table 10.- Average acreage plowed in a 10-hour day, and width of cut plowed, by type and size of tractor, United States, 1940

Tractor size group 1/	Average tractor size 1/	Width of cut plowed: Per tractor	Width of cut plowed: Per rated D.B.H.P.	Acreage plowed in 10-hour day: Per tractor	Acreage plowed in 10-hour day: Per foot of plow cut	Acreage plowed in 10-hour day: Per D.B.H.P.
D.B.H.P.	D.B.H.P.	Inches	Inches	Acres	Acres	Acres
			General-Purpose			
Less than 12	10.3	24.5	2.38	6.3	3.09	.61
12 to 18.4	15.8	28.5	1.80	8.0	3.37	.51
18.5 to 24.9	20.4	32.9	1.61	9.6	3.50	.47
25 and over	26.6	38.7	1.45	11.8	3.66	.44
All sizes	15.2	28.4	1.87	7.9	3.35	.52
			Standard-Wheel			
Less than 12	10.8	26.5	2.45	6.3	2.85	.58
12 to 18.4	15.7	34.7	2.21	9.7	3.36	.62
18.5 to 24.9	22.4	39.9	1.78	12.0	3.72	.54
25 and over	28.3	52.5	1.86	16.6	3.80	.59
All sizes	15.9	33.5	2.11	9.0	3.23	.57
			Track-Laying			
Less than 12	10.3	27.9	2.71	6.0	2.58	.58
12 to 18.4	16.2	38.9	2.40	9.4	2.90	.58
18.5 to 24.9	20.4	43.7	2.14	11.7	3.21	.57
25 and over	32.6	68.4	2.10	17.8	3.12	.55
All sizes	24.2	52.4	2.17	13.6	3.11	.56
			All three types 2/			
All sizes	15.9	31.5	1.98	8.6	3.28	.54

1/ See footnote 2, table 3.

2/ For all tractors including home-made and garden the average width of cut was 31.3 inches and the average area plowed in a 10-hour day was 8.5 acres.

See tables 16 and 17 for more detailed information.

It is clear that the plows used with many of the large sized general-purpose tractors are small in relation to the tractor size. For each type of tractor, the width of cut plowed per rated D.B.H.P. decreased with increase in size of tractor, but more land was plowed per foot of plow cut, with the large tractors than with the small tractors (table 10). The increase in area plowed per foot of plow cut is probably due to the higher rate of travel of the larger tractors, and to a greater use of large tractors on large fields.

PLOWING RATE HIGH IN WESTERN REGIONS

Reflecting largely differences in plowing conditions and size of tractor are significant regional differences in the plowing rate per day. The area plowed per 10-hour day is considerably above the national average in the Great Plains, the Pacific Coast States and in Oklahoma and Texas, where the tractors are of large size. Also, the area plowed per rated D.B.H.P. is high in the Great Plains and in Oklahoma and Texas, and is low in the North Atlantic, South Atlantic, and South Central States (table 11). In the Great Plains and in Oklahoma and Texas, the fields tend to be large and level. In the Eastern and Southern States, where the area plowed is small in relation to tractor size, the fields are generally of small size. For most State groups, the width of plow cut for all tractors averaged about 2 inches per rated D.B.H.P. However, the area plowed per foot of width of plow cut varied in different parts of the country. In the Eastern, the Southern, the Pacific, and the Lake States, performance in this respect was below average. The area plowed per foot of plow cut, was high in Oklahoma and Texas and in the Great Plains.

NEWER TRACTORS PLOW MORE LAND PER DAY

Age of tractor, largely because it reflects differences in tractor size, influences the plowing rate. The difference in plowing rate as regards tractor age was more pronounced for standard-wheel tractors than for other types. With the older tractors, the width of cut plowed per rated D.B.H.P. was greater than for the newer ones, but with the newer tractor the area plowed per foot of plow cut was greater than for the older tractors (table 12).

RUBBER TIRES INCREASE PLOWING RATE

Plows drawn by general-purpose tractors equipped with rubber tires, plowed about 10 percent more land per 10-hour day than was plowed with tractors with steel wheels. The percentage increase in plowing rate was fairly uniform for the various age groups. Fuel consumption per hour of tractor use was about the same for tractors of the same age with rubber tires as with steel wheels (table 13). However, tractors with rubber

Table 11.- Average acreage plowed in a 10-hour day, and width of cut plowed, by State groups, all tractors, 1940 1/

State groups 2/	Average tractor size 3/	Width of cut plowed		Acreage plowed in 10-hour day		
		Per tractor	Per rated D.B.H.P.	Per tractor	Per foot of plow cut	Per D.B.H.P.
	D.B.H.P.	Inches	Inches	Acres	Acres	Acres
North Atlantic	13.4	26.1	1.95	5.9	2.71	.44
Corn Belt	15.5	29.2	1.88	8.0	3.29	.52
Lake States	15.0	30.0	2.00	7.9	3.16	.53
Great Plains	17.6	38.1	2.16	11.4	3,58	.65
South Atlantic	13.6	27.1	1.99	6.3	2.79	.46
South Central	15.2	27.1	1.78	6.9	3.05	.45
Oklahoma-Texas	16.6	32.2	1.94	10.0	3.73	.60
Mountain	18.1	34.4	1.90	9.5	3.31	.52
Pacific	19.8	40.7	2.06	10.4	3.07	.53
United States	15.9	31.5	1.98	8.6	3.28	.54

1/ Includes all ages of general-purpose, standard-wheel, and track-laying tractors, which together constitute about 98 percent of all tractors on the reporting farms.

2/ See footnotes 3 to 10, table 3.

3/ See footnote 2, table 3.

See table 17 for further details on age and type of tractor.

Table 12.- Average acreage plowed in a 10-hour day, and width of cut plowed, by type and age of tractor, United States, 1940

Age of tractor, Jan. 1, 1941	Average tractor size 1/	Width of cut plowed		Acreage plowed in 10-hour day		
		Per tractor	Per rated D.B.H.P.	Per tractor	Per foot of plow cut	Per D.B.H.P.
	D.B.H.P.	Inches	Inches	Acres	Acres	Acres
	General-Purpose					
Less than 5 years	15.5	28.2	1.82	7.9	3.36	.51
5 - 9 years	14.8	28.7	1.94	7.9	3.31	.53
10 - 14 years	13.6	29.0	2.13	7.6	3.14	.56
All ages 2/	15.2	28.4	1.87	7.9	3.33	.52
	Standard-Wheel					
Less than 5 years	18.9	36.2	1.92	10.9	3.61	.58
5 - 9 years	16.7	35.0	2.10	9.6	3.29	.57
10 - 14 years	15.2	33.3	2.19	8.6	3.09	.57
15 years and over	12.6	28.8	2.29	6.4	2.67	.51
All ages	15.9	33.5	2.11	9.0	3.23	.57
	Track-Laying					
Less than 5 years	25.1	53.6	2.14	14.7	3.29	.59
5 - 9 years	23.5	52.1	2.22	12.3	2.83	.52
10 - 14 years	22.4	49.1	2.19	11.9	2.91	.53
All ages 2/	24.2	52.4	2.17	13.6	3.11	.56

1/ See footnote 2, table 3.

2/ Includes tractors over 15 years old.

See tables 16 and 17 for more detailed information.

tires were used about 18 percent more per year than were tractors with steel wheels, but the amount of work done with rubber-tired tractors exceeded the amount of work done with steel-wheeled tractors by considerably more than 18 percent. Plowing is relatively heavy work and is usually performed at relatively low rates of travel. With rubber tires, slippage losses are important, but loss from slippage decreases as the tractor speed increases.

Rate of travel for light work is sometimes about 50 percent higher with rubber-tired tractors than for tractors with steel wheels. It seems likely that taking all farm work into consideration, around 20 percent more work can be done per day with rubber-tired tractors than with tractors with steel wheels. It does not follow, however, that annual tractor use will be increased on a particular farm because the tractor is equipped with rubber tires.

Table 13. - Performance of general-purpose tractors with rubber and with steel traction, United States, 1940

Tractor age group, Jan. 1, 1941	Tractors reporting	Wheel traction of tractor 1/	Average area plowed in 10-hour day	Average time used in 1940	Fuel consumed per hour of use
	Number		Acres	Hours	Gallons
Less than 5 years	1,527	rubber	8.1	571	1.56
Less than 5 years	721	steel	7.5	504	1.54
5 - 9 years	186	rubber	8.7	662	1.63
5 - 9 years	270	steel	7.5	493	1.61
10 - 14 years	63	rubber	8.0	611	1.59
10 - 14 years	179	steel	7.3	449	1.69
All ages	1,176	rubber	8.1	582	1.57
All ages	1,170	steel	7.4	493	1.57

1/Tractors with rubber traction had rubber tires front and rear. Tractors with steel traction include a few tractors that had rubber tires either on front or rear wheels.

TWO-BOTTOM TRACTOR PLOWS POPULAR SIZE

Two sizes of plows, the 24-inch and the 28-inch, together accounted for more than half of all tractor plows used in 1940 (table 14). Plows cutting 28 inches were more numerous than any other size, accounting for almost 40 percent of all tractor plows.

Only 9 percent of the tractor plows were 20 inches and less in size. The 20-inch size chiefly represents 2-10-inch bottoms. About 6 percent of all tractor plows were 16-inch and less in size. This figure represents very closely the percentage of one-bottom tractor plows.

Plows of the 42-inch and 48-inch sizes were fairly important, amounting to 19 percent of all tractor plows. The 42-inch size, usually 3-14-inch bottom, was more common than the 48-inch size.

Only 2 percent of all tractor plows were of the 60-inch size and over. Odd sized plows, with width of cut exceeding 20 inches but less than 60 inches, accounted for about 3 percent of all tractor plows. The figures mentioned apply to the country as a whole and for plows drawn by general-purpose, standard-wheel and track-laying tractors.

Size of tractor plows vary considerably in different parts of the country depending largely on size of tractor and physical conditions of the area. In the eastern half of the country around 75 percent of all tractor plows are 28 inches and less in size (table 15).

In the eastern and southern areas the tractors are of relatively small size but even with the larger tractors, relatively small plows are used.

In the western part of the country tractor plows are relatively of large size. Here the plow size is usually fairly well adjusted to the size of the tractor. Even in the western areas, 24-inch and 28-inch plows are important.

Although there are wide variations in the size of plows drawn by tractors of a specified size group, size of plow increases with increase in tractor size. Only 9 percent of the tractor plows drawn by tractors of 25 and more D.B.H.P. ratings were 28 inches or less in size. This figure compares with 90 percent for tractors with ratings of 12 D.B.H.P. and less. The wide variations in the size of plows drawn by tractors of similar size are believed to represent mainly differences in power requirements for plowing. But after making considerable allowance for difference in power requirements, some plows were unusually large and some were unusually small in relation to the tractor size. Many large tractors used small plows in relation to their size.

Table 14.- Size of plows drawn by tractors of specified size and age, United States, 1940 1/

Age of tractor Jan. 1, 1941	Percentage of plows of indicated sizes							
	20 inches and less	24 and 28 inches	32 and 36 inches	42 and 48 inches	56 and 60 inches	Over 60 inches	Other report-ed odd sizes	All sizes
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Less than 12 D. B. Horsepower								
Less than 5 years	24	68	3	1	-	-	4	100
5 to 9 years	12	75	6	4	-	-	3	100
10 to 14 years	8	80	5	4	-	-	3	100
15 years and over	19	73	2	2	-	-	4	100
All ages	17	73	4	3	-	-	3	100
12 to 18.4 D. B. Horsepower								
Less than 5 years	11	60	15	11	-	-	3	100
5 to 9 years	3	59	17	16	1	-	4	100
10 to 14 years	2	34	11	40	7	1	5	100
15 years and over	-	29	7	44	7	-	13	100
All ages	8	54	14	18	2	-	4	100
18.5 to 24.9 D. B. Horsepower								
Less than 5 years	2	41	17	30	6	1	3	100
5 to 9 years	2	23	15	43	11	2	4	100
10 to 14 years	-	10	6	60	19	2	3	100
15 years and over	-	19	8	38	19	4	12	100
All ages	2	30	14	39	10	2	3	100
25.0 to 31.4 D. B. Horsepower								
Less than 5 years	-	12	8	30	27	21	2	100
5 to 9 years	-	8	11	31	35	15	-	100
10 to 14 years	-	2	6	26	41	25	-	100
15 years and over	-	-	-	-	40	60	-	100
All ages	-	9	8	29	31	22	1	100
All Sizes								
Less than 5 years	11	53	12	15	4	2	3	100
5 to 9 years	6	51	12	20	6	2	3	100
10 to 14 years	4	49	7	27	8	2	3	100
15 years and over	14	59	3	12	4	2	6	100
All ages	9	52	10	19	5	2	3	100

1/ Home-made and garden tractors not included.

Table 15.- Size of plows drawn by tractors of specified size, State groups, 1940

Size of tractor	Percentage of plows of indicated sizes							
	20 inches and less	24 and 28 inches	32 and 36 inches	42 and 48 inches	56 and 60 inches	Over 60 inches	Other report-ed odd sizes	All sizes
D.B.H.P 1/	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
	North Atlantic							
Less than 12	22	73	3	1	-	-	1	100
12 to 18.4	14	74	9	2	-	-	1	100
18.5 to 24.9	1	70	10	15	3	-	1	100
All sizes 2/	17	74	5	3	-	-	1	100
	Corn Belt							
Less than 12	10	85	2	1	-	-	2	100
12 to 18.4	4	69	17	9	-	-	1	100
18.5 to 24.9	-	50	17	30	-	-	3	100
25.0 to 31.4	-	20	12	53	3	12	-	100
All sizes	5	70	11	12	-	-	2	100
	Lake States							
Less than 12	11	79	6	2	-	-	2	100
12 to 18.4	7	55	19	16	1	-	2	100
18.5 to 24.9	1	36	22	39	2	-	-	100
25.0 to 31.4	-	21	17	42	12	8	-	100
All sizes	7	60	14	16	1	-	2	100
	Great Plains							
Less than 12	3	78	5	12	-	-	2	100
12 to 18.4	1	39	15	37	6	-	2	100
18.5 to 24.9	-	12	6	54	23	4	1	100
25.0 to 31.4	-	3	2	17	54	24	-	100
All sizes	1	37	8	35	14	3	2	100
	South Atlantic							
Less than 12	20	67	7	1	-	-	5	100
12 to 18.4	17	60	5	10	-	-	8	100
18.5 to 24.9	7	57	11	7	-	-	18	100
25.0 to 31.4		13	25	50	12	-	-	100
All sizes	17	61	7	7	-	-	8	100

- Continued -

Table 15. - Size of plows drawn by tractors of specified size, State groups, 1940 - Continued

Size of tractor	Percentage of plows of indicated sizes							
	20 inches and less	24 and 28 inches	32 and 36 inches	42 and 48 inches	56 and 60 inches	Over 60 inches	Other report-ed odd sizes	All sizes
D.B.H.P. 1/	Percent	Percent	Percent	Percent	Percent	Percent	Percnet	Percent
				South Central				
Less than 12	36	49	–	3	–	1	11	100
12 to 18.4	22	49	7	3	–	1	18	100
18.5 to 24.9	8	50	20	5	5	–	12	100
25.0 to 31.4	–	18	37	27	–	9	9	100
All sizes	24	48	8	5	1	1	13	100
				Oklahoma-Texas				
Less than 12	18	55	10	1	–	–	16	100
12 to 18.4	10	54	18	7	–	–	11	100
18.5 to 24.9	2	14	13	53	9	3	6	100
25.0 to 31.4	–	–	–	20	80	–	–	100
All sizes	9	39	13	19	8	1	11	100
				Mountain				
Less than 12	45	46	2	1	–	–	6	100
12 to 18.4	24	28	10	28	6	1	3	100
18.5 to 24.9	7	17	10	42	15	2	7	100
25.0 to 31.4	–	3	8	17	30	39	3	100
All sizes	22	27	8	23	10	5	5	100
				Pacific				
Less than 12	41	49	6	–	–	–	4	100
12 to 18.4	11	36	14	25	1	4	9	100
18.5 to 24.9	4	17	26	33	13	3	4	100
25.0 to 31.4				30	36	32	2	100
All sizes	15	25	11	21	14	10	4	100

1/ See footnote 2, table 3.

2/ Includes few tractors of 25 D.B.H.P. rating or more.

PLOWS DRAWN BY OLD TRACTORS ARE OF LARGE SIZE

There was a tendency for plows drawn by the older tractors to be larger than those drawn by newer tractors of the same size group. This applies especially to the wheel tractors of more than 12 D.B.H.P. (tables 12 and 14).

A relatively high percentage of the new wheel tractors have rubber tires. Adoption of rubber tires increases the D.B.H.P. rating of tractor, but at low rates of travel, such as are ordinarily used for plowing, rubber-tired tractors develop about the same drawbar pull as do similar tractors with steel wheels. Hence, the net effect of adopting rubber tires is to increase the tractor size as measured in D.B.H.P. rating and to decrease the width of plow drawn per D.B.H.P. Also, the older tractors weighed more per D.B.H.P., and traveled at a slower rate of speed than did the newer tractors. The lower rate of travel, and the greater tractor weight, make it possible for the older tractors to draw relatively large plows per D.B.H.P.

Table 16. - Annual use, fuel consumed, and work performed, by age, size and type of tractor, average of United States, 1940

Number of tractors on farms Jan. 1, 1941	Tractor size group	Average width of cut plowed	Average acres plowed in 10-hour day	Average time used in 1940	Fuel consumed per hour of use
			General-purpose - Less than 5 years		
Thousands	D.B.H.P.	Inches	Acres	Hours	Gallons
208	Less than 12	23.9	6.2	482	1.24
321	12 - 18.4	28.2	7.9	566	1.56
146	18.5 - 24.9	32.4	9.5	598	1.82
25	25 and over	38.5	11.8	670	2.08
700	All sizes	28.2	7.9	552	1.56
			General-purpose - 5 to 9 years		
56	Less than 12	24.7	6.5	504	1.32
62	12 - 18.4	29.7	8.3	558	1.70
28	18.5 - 24.9	34.6	9.8	704	1.86
1	25 and over	45.2	12.8	522	2.50
147	All sizes	28.7	7.9	564	1.58
			General-purpose - 10 to 14 years		
39	Less than 12	27.5	6.5	486	1.43
35	12 - 18.4	29.1	8.6	534	1.85
5	18.5 - 24.9	37.9	10.3	372	2.16
1	25 and over	45.7	12.7	433	2.54
80	All sizes	29.0	7.7	500	1.66
			General-purpose - All ages 1/		
932	All sizes	28.4	7.9	549	1.58
			Standard-wheel - Less than 5 years		
34	Less than 12	27.4	6.9	423	1.55
26	12 - 18.4	30.8	9.0	555	1.69
59	18.5 - 24.9	39.2	12.3	628	2.29
19	25 and over	52.4	17.5	795	2.96
138	All sizes	36.2	10.9	582	2.10

- Continued -

Table 16. - Annual use, fuel consumed, and work performed, by age, size and type of tractor, average of United States, 1940 -Cont'd

Number of tractors on farms Jan. 1, 1941	Tractor size group	Average width of cut plowed	Average acres plowed in 10-hour day	Average time used in 1940	Fuel consumed per hour of use
Thousands	D.B.H.P.	Inches	Acres	Hours	Gallons
Standard-wheel - 5 to 9 years					
44	Less than 12	27.7	6.9	368	1.62
14	12 - 18.4	37.2	10.2	473	2.20
44	18.5 - 24.9	40.4	11.6	576	2.30
6	25 and over	48.6	15.3	631	2.85
108	All sizes	35.0	9.6	477	2.10
Standard-wheel - 10 to 14 years					
139	Less than 12	26.8	6.5	284	1.70
60	12 - 18.4	35.0	10.3	422	2.25
75	18.5 - 24.9	39.8	12.8	362	2.65
8	25 and over	50.6	15.8	613	3.16
282	All sizes	33.3	8.6	339	2.04
Standard-wheel - 15 years and over					
71	Less than 12	24.5	5.4	195	1.64
13	12 - 18.4	38.7	8.5	236	2.09
7	18.5 - 24.9	42.5	12.1	256	2.78
3	25 and over	68.8	15.4	238	3.20
94	All sizes	28.8	6.4	206	1.82
Standard-wheel - all ages					
622	All sizes	33.5	9.0	396	2.06
Track-laying - Less than 5 years					
1	Less than 12	30.0	7.2	292	1.60
6	12 - 18.4	40.9	10.6	626	2.15
18	18.5 - 24.9	44.7	12.5	689	2.50
23	25 and over	65.9	18.3	926	2.70
48	All sizes	53.6	14.7	780	2.50

Table 16. - Annual use, fuel consumed, and work performed by age, size and type of tractor, average of United States, 1940 - Continued

Number of tractors on farms Jan. 1, 1941	Tractor size group	Average width of cut plowed	Average acres plowed in 10-hour day	Average time used in 1940	Fuel consumed per hour of use
Thousands	D.B.H.P.	Inches	Acres	Hours	Gallons
		Track-Laying - 5 to 9 years			
2	Less than 12	28.7	5.8	383	1.60
3	12 - 18.4	38.0	8.6	498	2.09
6	18.5 - 24.9	40.6	9.6	477	2.35
6	25 and over	76.2	18.0	960	2.90
17	All sizes	52.1	12.3	650	2.48
		Track-laying - 10 to 14 years			
2	Less than 12	27.6	5.7	280	1.62
3	12 - 18.4	38.8	8.8	466	2.07
2	18.5 - 24.9	44.4	11.3	213	2.40
6	25 and over	66.0	16.0	619	2.80
13	All sizes	49.1	11.9	448	2.51
		Track-laying - 15 years and over			
1	Less than 12	18.7	5.5	213	1.60
1	12 - 18.4	34.6	8.0	283	2.00
1	18.5 - 24.9	42.0	10.7	428	2.24
2	25 and over	79.6	17.5	310	3.06
5	All sizes	52.1	12.5	314	2.41
		Track-laying - all ages			
83	All sizes	52.4	13.6	671	2.49
		Home-made			
25		18.0	4.1	248	1.19
		All tractors 2/			
1,665		31.3	8.5	493	1.76

1/ Includes some general-purpose tractors over 15 years old.

2/ Includes general-purpose, standard-wheel, track-laying, home-made, and garden tractors. The number of garden tractors included in the study was too small to be of significance.

Table 17.- Average annual usage, fuel consumed, and work performed, by age and type of tractor, selected State groups, 1940

State group	Number tractors of specified age on farms Jan. 1, 1941	Average rating of tractors in study	Average width of cut plowed	Average acres plowed in 10-hour day	Average time used in 1940	Fuel consumed per hour of use
	Thousands	D.B.H.P.	Inches	Acres	Hours	Gallons
	General-purpose - Less than 5 years					
North Atlantic	65	14.5	24.7	6.0	490	1.45
Corn Belt	253	15.9	28.0	7.9	512	1.57
Lake States	123	15.2	28.7	7.9	493	1.48
Great Plains	84	16.4	33.1	10.1	696	1.67
South Atlantic	29	14.0	26.7	6.2	455	1.50
South Central	35	16.1	25.8	6.9	506	1.58
Oklahoma-Texas	71	15.5	29.6	9.2	730	1.68
Mountain	24	15.0	23.4	6.4	526	1.49
Pacific	16	13.9	24.3	6.7	662	1.42
Total or avg.	700	15.5	28.2	7.9	552	1.56
	General-purpose - 5 - 9 years					
North Atlantic	12	13.5	25.5	6.0	507	1.38
Corn Belt	62	14.8	28.4	7.8	490	1.66
Lake States	16	14.6	29.6	7.6	514	1.57
Great Plains	23	15.4	32.0	9.4	632	1.64
South Atlantic	2	13.5	23.6	6.0	336	1.50
South Central	6	14.6	25.3	6.1	495	1.71
Oklahoma-Texas	19	15.0	29.9	8.9	851	1.53
Mountain	5	15.5	25.1	6.8	585	1.72
Pacific	2	14.4	26.1	7.3	515	1.73
Total or avg.	147	14.8	28.7	7.9	564	1.58
	General-purpose - 10-14 years					
North Atlantic	6	11.7	28.1	5.8	346	1.45
Corn Belt	26	13.7	28.7	7.7	462	1.69
Lake States	7	13.5	29.7	7.8	469	1.63
Great Plains	19	13.5	31.0	8.8	523	1.70
South Atlantic	2	14.6	31.5	7.5	378	1.81
South Central	3	13.5	26.2	5.9	307	1.46
Oklahoma-Texas	14	14.1	28.0	8.5	669	1.58
Mountain	2	14.4	24.6	6.5	537	1.67
Pacific	1	10.9	28.7	6.0	283	1.45
Total or avg.	80	13.6	29.0	7.6	500	1.66
	General-purpose - All ages 1/					
United States	932	15.2	28.4	7.9	549	1.58

- Continued -

Table 17.- Average annual usage, fuel consumed, and work performed, by age and type of tractor, selected State groups, 1940 - Continued

State group	Number tractors of specified age on farms, Jan. 1, 1941	Average rating of tractors in study	Average width of cut plowed	Average acres plowed in 10-hour day	Average time used in 1940	Fuel consumed per hour of use
	Thousands	D.B.H.P.	Inches	Acres	Hours	Gallons
	Standard-wheel - Less than 5 years					
North Atlantic	12	14.4	27.2	6.0	452	1.61
Corn Belt	31	17.8	30.5	8.9	477	1.75
Lake States	19	18.0	32.1	9.0	541	1.95
Great Plains	31	21.7	47.0	15.2	758	2.34
South Atlantic	7	15.2	27.4	7.1	478	1.80
South Central	6	18.5	31.4	8.8	620	2.30
Oklahoma-Texas	17	21.3	42.5	13.8	649	2.36
Mountain	9	21.8	41.5	12.7	571	2.41
Pacific	6	16.0	30.2	8.5	502	1.88
Total or avg.	138	18.9	36.2	10.9	582	2.10
	Standard-wheel - 5 - 9 years					
North Atlantic	11	12.2	27.9	5.9	416	1.60
Corn Belt	25	16.1	32.5	8.8	415	2.01
Lake States	20	15.1	32.8	8.2	381	1.81
Great Plains	23	20.0	45.7	14.2	682	2.38
South Atlantic	5	13.8	27.3	6.1	340	1.87
South Central	4	15.0	32.3	7.5	524	2.10
Oklahoma-Texas	9	19.7	34.8	13.0	441	2.39
Mountain	6	19.9	37.2	11.9	631	2.40
Pacific	5	15.3	32.0	8.1	351	1.93
Total or avg.	108	16.7	35.0	9.6	477	2.10
	Standard-wheel - 10 - 14 years					
North Atlantic	26	11.9	25.9	5.5	244	1.59
Corn Belt	63	14.1	31.2	7.9	294	1.82
Lake States	52	14.3	31.3	8.0	301	1.99
Great Plains	75	17.8	39.3	11.6	432	2.29
South Atlantic	10	11.7	25.4	5.4	242	1.75
South Central	8	11.5	27.4	6.0	358	1.73
Oklahoma-Texas	18	18.0	35.9	10.8	310	2.19
Mountain	20	17.1	37.7	10.3	435	2.14
Pacific	10	13.2	29.3	6.7	300	1.91
Total or avg.	282	15.2	33.3	8.6	339	2.04

- Continued -

Table 17.- Average annual usage, fuel consumed, and work performed, by age and type of tractor, selected State groups, 1940 - Continued

State group	Number tractors of specified age on farms, Jan. 1, 1941	Average rating of tractors in study	Average width of cut plowed	Average acres plowed in 10-hour day	Average time used in 1940	Fuel consumed per hour of use
	Thousands	D.B.H.P.	Inches	Acres	Hours	Gallons
			Standard-wheel - 15 years and over			
North Atlantic	18	11.0	24.8	4.9	189	1.64
Corn Belt	20	13.3	30.7	7.2	186	1.82
Lake States	18	12.5	28.6	6.7	194	1.71
Great Plains	12	15.9	40.9	9.9	264	2.30
South Atlantic	7	10.7	24.3	4.8	235	1.59
South Central	5	11.0	24.8	5.3	191	1.64
Oklahoma-Texas	3	14.1	24.8	8.5	241	2.00
Mountain	3	14.0	32.1	7.6	223	1.93
Pacific	8	11.4	20.5	5.5	197	1.70
Total or avg.	94	12.6	28.8	6.4	206	1.82
			Standard-wheel - All ages			
United States	622	15.9	33.5	9.0	396	2.06
			Track-laying - Less than 5 years			
Western States	34	26.7	55.7	15.0	838	2.51
All other	14	21.5	48.4	14.0	642	2.46
Total or avg.	48	25.1	53.6	14.7	780	2.50
			Track-laying - 5 - 9 years			
Western States	11	25.5	58.1	13.4	711	2.57
All other	6	19.3	39.9	10.0	522	2.23
Total or avg.	17	23.5	52.1	12.3	650	2.48
			Track-laying - 10 - 14 years			
Western States	8	25.0	53.0	12.6	561	2.62
All other	5	18.7	43.7	10.8	287	2.22
Total or avg.	13	22.4	49.1	11.9	448	2.51
			Track-laying - 15 years and over			
Western States	3	23.3	47.3	12.1	369	2.41
All other	2	23.2	59.7	13.0	224	2.44
Total or avg.	5	23.3	52.1	12.5	314	2.41
			Track-laying - All ages			
United States	83	24.2	52.4	13.6	671	2.49
			Home-made			
United States	25		18.0	4.1	248	1.19
			All tractors 1/			
United States	1,665		31.3	8.5	493	1.76

1/ Includes the above types and garden tractors. The number of garden tractors included in the study was too small to be of significance.